Successful Application of Ultradril High Performance Water Based Mud (HPWBM) with Poroseal mitigates problematic Nahr Umr Shale in 8 ½” interval, Offshore Abu Dhabi

“The M-I SWACO Ultradril system with Poroseal assisted in eliminating reaming and drag issues previously observed when utilizing other WBM systems”

Kerron Andrews, Project Engineer

Well Information
Location .......................................................... Offshore Abu Dhabi, United Arab Emirates
Well Type / Maximum Inclination .......................................................... Vertical / 15°
Interval .......................................................... 8-1/2”
Interval drilled .......................................................... Total of 2,565 ft (781 m) drilled from 7,545 ft to 10,110 ft (2,299 to 3,081 m)
Density .......................................................... 10.50-11.00 lb/gal (1.26-1.32 s.g.)

The Situation
Previous wells drilled in this area utilized a PHPA/Polymer system for drilling of the shale intervals, however when logging it was often observed that the interval was found to be over-guaged. Due to issues related to troublesome Nahr Umr shale section, the operator required a High Performance Water Base Mud (HPWBM). Previous attempts in 2004 to use a HPWBM system lead to severe wellbore instability issues.

The Solution
The M-I SWACO Ultradril with Poroseal system was introduced with the purpose of ensuring shale stability and reducing the occurrence of over-guage hole to assist in cementing operations. The system was chosen because of its highly inhibitive nature, achievable enhanced drilling performance, and shale stabilization through reduced pore pressure transmission with Poroseal and Ultrahib. Adding to the fact that this system had been proven in other offshore applications in Abu Dhabi, and project-specific laboratory evaluations showed Ultradril was fit for required goals.

The use of the Ultradril system has also allowed other operators to eliminate the need for reaming particular intervals which had an impact on the days required to drill the section.

The Results
The 8-1/2” interval was drilled and 7” liner was successfully run to bottom without any drilling fluid related issues. The Ultradril system with Poroseal additive was able to ensure:

- Elimination of the need for backreaming certain intervals
- No NPT due to drilling fluids was observed
- No stuck pipe/No bit balling
- Reduction in previously observed drag readings
The Details
The well was displaced to the Ultradril system with 3% v/v Poroseal additive as programmed. The 8 ½” interval was drilled through the Nahr Umr shale interval with after the mud weight was increased from 10.5 to 11.0 lb/gal (1.26-1.32 SG). The interval was drilled to TD and a wiper trip was performed prior to POOH to check the hole condition with no tight spots were observed. No further tight spots were observed while POOH and running casing. Casing was run to bottom with slight fill encountered at TD, which was easily washed through. Fig.1 below shows the condition of the bit after the trip out of the hole and Fig.2 show cuttings which have sharp, well defined edges typical of well inhibited cuttings. The drilling fluid properties were stable throughout the drilling operations and logging results showed a better guage hole than experienced on previous wells. There are no direct benchmarks available as alternative inhibitive systems have not been used in the 8 ½” interval.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Well # 1</th>
<th>Well # 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to TD and RIH with Liner /hrs</td>
<td>246</td>
<td>256</td>
</tr>
<tr>
<td>Bit Size / inches</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Fluid Type</td>
<td>Ultradril</td>
<td>Ultradril/Poroseal</td>
</tr>
<tr>
<td>Calculated Hole size (Shale Interval)</td>
<td>17.1</td>
<td>11.8</td>
</tr>
<tr>
<td>Wash Out %</td>
<td>101</td>
<td>39</td>
</tr>
</tbody>
</table>

The operator plans to use the Ultradril/Poroseal system for the next sidetrack after evaluating the achieved results.

Questions? We’ll be glad to answer them.
If you’d like to know more about Ultradril system, and how it’s performing for our other customers, please call the M-I SWACO office nearest you.